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10/536,599	07/19/2005	Yasuhiro Watanabe	112857-456	9306

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EXAMINER	
WANG, EUGENIA	
ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/536,599	WATANABE ET AL.	
	Examiner	Art Unit	
	EUGENIA WANG	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 February 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *42-82* is/are pending in the application.

4a) Of the above claim(s) *64-80 and 82* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *42-63 and 81* is/are rejected.

7)☒ Claim(s) *42-63 and 81* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 May 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :7/18/05, 6/22/07, 8/9/07, 1/21/09.

DETAILED ACTION

Preliminary Amendment

1. The preliminary amendments received May 26, 2005 and November 2, 2005 have been acknowledged.

Election/Restrictions

2. Applicant's election without traverse of Species A (claims 42-63 and 81) in the reply filed on February 25, 2009 is acknowledged.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

4. The information disclosure statements filed July 18, 2005, June 22, 2007, August 9, 2007, and January 21, 2009 have been placed in the application file and the information referred to therein has been considered as to the merits. It is noted that: (a) Some of the references cited on the July 18, 2005 statement only provides the translated abstract, wherein only the provided portion has been considered. For full consideration, Examiner invites Applicant to provide the full disclosure and translation of that full disclosure. (b) With respect to the statements filed on June 22, 2007 and August 9, 2007, some of the cited references have been cited in a previous statement (the one dated July 18, 2005). Accordingly, they are duplicate references and have already been considered, and thus have been crossed out. (c) With respect to the

Japanese Office action (cited on the August 9, 2007 statement), such a document and its translation has not been provided, and thus it has not been considered.

Drawings

5. The drawings are objected to because it appears in fig. 1 that "10" is used twice to note a casing and a portion below the casing. However, it appears that perhaps the lower denoted "10" is a typographical error, wherein control substrate "20" should have been noted instead (as indicated by p 15, lines 22-23 of the substitute specification). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

6. The drawings are objected to because it appears in fig. 7B that "73" is used twice. However, it appears that perhaps the left-hand side denoted "73" is a typographical error, wherein seal "74" should have been noted instead (as indicated by p 22, lines 20-23 of the substitute specification). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

7. Claims 42-63 and 81 are objected to because of the following informalities: the preamble of the claim is drawn to a fuel cell (wherein a fuel cell typically is drawn to parts of a fuel cell - electrodes, membrane, and separator). However, it appears as if

the body of the claim is drawn towards a fuel cell system, as external flow means and controllers (as claimed in dependent claim 63), are not typically part of the fuel cell but rather the fuel cell system. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 51-53 and 55 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claims 51-53 recite the limitation "the sectional area" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. Since claim 55 is dependent on claim 52 and fails to rectify this issue, it is rejected for the same reason.

b. Claim 55 recite the limitation "said water discharge means" in lines 1-3. There is insufficient antecedent basis for this limitation in the claim. Examiner suggests that the dependency of claim 55, currently off of claim 52, is a typographical error, wherein claim 55 should be dependent off of claim 54, which provides sufficient antecedent basis. Accordingly, for the prosecution of this office action, claim 55 is seen to be dependent on claim 54, which provides the antecedent basis, rather than claim 52.

35 USC § 112, Sixth Paragraph

9. It is noted, although Applicant uses “means for” language in several of the pending claims (claims 42, 46, 54, 55, 57, 58, 62, 63, and 81) it is interpreted that Applicant is *not* intending to impart 112(6). Such an interpretation is taken due to the ambiguity with respect to 112(6) as related to the claim language. For example claim 42 has a “gas flow means for causing"; however a “cooling means” is also claimed. Accordingly it is unsure whether the 112(6) is being invoked, due to the use of both “means for” and "means" without "for." Additionally, some of the claims that recite “means for” fail to meet the three prong test of properly invoking 112(6). For example claim 54 claims a “water discharge means for discharging water.” However, later in claim 54 the discharging is said to be done by generating a difference in pressure, and thus imparts structure and acts for achieving the specified function, thus failing to meet the third prong in the three-prong analysis. Additionally, claim 55 further imparts structure/acts for achieving the function by claiming that the discharge means “opens a part of the discharge passage to the atmosphere,” which clearly modifies the means for with structure/acts for achieving (having a discharge passage that is opened and closed). Similarly claim 57 has means for language (“means for detecting”), wherein claim 58 imparts structure/acts for achieving to the means for by requiring a temperature and/or humidity detection and claim 59 further imparts structure by claiming placement of such means. Again, this fails to meet the three-prong analysis required for invoking 112(6). See MPEP § 2181. Accordingly, due to the reasons set forth above, the claims are not seen to be invoking 112, sixth paragraph, wherein such an

interpretation is applied to the office action. If Applicant is not invoking 112(6), Examiner suggests removing the "means for" language from the claims. However, if Applicant is invoking 112, sixth paragraph, Examiner requires Applicant (a) to more clearly set forth within the Specification what structure, materials, or acts perform the recited claim element of means for supplying, means for suctioning, means for discharging (of claims 42, 46, 54, 62, and 81) (similarly as to the manner in which the pressure control means is set forth as a regulator in the last paragraph of p 28 of the Specification) and (b) to amend the claims in such a manner that 112(6) is being properly invoked. It is noted that Applicant's failure to respond to or clarify the 112, sixth paragraph issues will be seen as an agreement as to the fact that 112, sixth paragraph has not been invoked.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 42-45, 47-52, 56, and 62 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 00/14819 (Chizawa et al.). It is noted that US 6613467 is being relied upon as an English translation of the corresponding WO document.

As to claim 42, Chizawa et al. teach of a general fuel cell system, which has a plurality of fuel cells [4] which react electrochemically to create power (power generation units) (col. 1, lines 30-43; fig. 1). It is stated that oxygen is fed to the system (and thus

some conduit containing oxygen gas must exist) (col. 1, lines 48-51). It is specifically noted that Chizawa et al. embodies such a typical fuel cell with modifications, as there is a statement as to only differences to the general fuel cell of fig. 1 will be described in their embodiments (col. 2, lines 26-28). In one particular embodiment, cooling means, specifically radiation fins [16], for radiating heat to the outer atmosphere (heat radiation unit) is embodied (col. 5, lines 5-10; col. 12, lines 55-59; fig. 9). It is noted that the system has gas-feeding means (gas flow means) for the reactants (thus encompassing both oxidant and fuel), wherein the gas-feeding means feeds each reactant separately into the separator (col. 5, lines 5-10). Fig. 9 shows that there are cooling fans [17] (cooling means) to cool the radiation fins [16] (heat radiation unit). (It noted that the fans are necessarily driven independently from the gas flow means, as the reactants are line to the fuel cells (as state within col. 5, lines 5-10), and fig. 9 shows that the fans are directed to the stack externally (via the arrows).)

As to claim 43, Chizawa et al. teach of a plurality of laminated fuel cells [6], wherein a each cell [4] (joint body) has electrodes (anode [1a] and cathode [1b]) with an ion conducting polymer electrolyte [3] in between the electrodes, as well as separators [5] that clamp either side (fig. 1; col. 1, lines 30-47).

As to claim 44, the ion conducting electrolyte as taught by Chizawa et al. is inherently proton conducting.

Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but

the function is not explicitly disclosed by the reference, the examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection.

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993).

"In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)

In the case of the instant application the basis for expectation of inherency is that the fuel embodied is hydrogen (col. 1, lines 48-49), wherein the only cation available via the electrochemical reaction using this fuel is a proton. Thus, the proton must be an ion that is conducted through an electrolyte (or else no electric power can be generated). This is also supported by col. 16, lines 15-20 and 29-32, which speak of having protons within the system, wherein the protons are transported.

The Examiner invites applicant to provide that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product.

Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596

(CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

As to claim 45, although not specifically shown in fig. 9, Chizawa et al. teach that the cooling means via radiating (i.e. radiating fins of fig. 9) are provided with the separator (col. 5, lines 4-10). Accordingly, it can be interpreted that separator and cooling means via radiating are in some manner integral, wherein a section of it can be the central portion of the separator can be interpreted to be the separator, the outer (radiation portion) can be interpreted to be a heat radiation unit, and a portion defined in between (and overlapping the defined separator portion) can be interpreted to be the heat radiation unit.

As to claim 47, Chizawa et al., the fuel cells [4] (joint bodies) are placed in a stack and are laminated (fig. 1; col. 1, lines 57-63).

As to claim 48, Chizawa et al. teach that fuel to the anode [1a] in a planar manner (fig. 10) (and thus must have an in-plane conduit for delivery in the manner seen in fig. 10). Since it is also stated that the reactants are fed via two different lines to the separator (col. 5, lines 4-10), the fuel must be fed to a place wherein the joint body and separator contact one another.

As to claim 49, Chizawa et al. teach that general fuel cells must have separators with grooves that feed reactive gases to each of the electrodes (thus indicative of a supply hole) (col. 1, lines 43-47). Additionally, in the first embodiment, it is indicated that in addition to un-reacted gas [101] being fed to the system, reacted gas [101] is taken out of the system (thus indicating some sort of discharge hole that is present),

wherein both cathode and anode reactant gas is embodied (fig. 2A; col. 8, lines 56-65). Furthermore, exploded form of joint body in fig. 7, is relied upon to show the basics of fuel cell geometry (with respect to wherein it is specifically noted that the composite separator would include the bipolar version of the separator plate (oxidant and fuel flow sides together, as would be present in a stack). The path for the anode flow is denoted by [13a] and goes from one opening to another.

As to claim 50, it is noted that Chizawa et al. teach a plurality of fuel cells within a fuel cell stack [9], wherein it is indicated that the supply holes and discharge holes of the plurality of separators line up with one another to create supply passages and discharge passages, respectively (see fig. 1, fig. 2A, fig. 2B, and fig. 7 to see the embodiment of a stack and how the conduits line up).

As to claims 51 and 52, it is again noted Chizawa et al. teach that fuel cells have grooves for feeding reactant through the separator (col. 1, lines 43-47). Fig. 5 shows the embodiment of an exploded fuel cell, wherein dotted line [13a] represents anode flow. As can be seen in fig. 5, the flow from one manifold to the other (one being the supply passage hole and the other being the discharge passage hole) is represented by a singular flow line, wherein the flow traverses over the length of the plate. In such a manner, the sectional area of the connecting means can be interpreted as the portion that leaves the manifold, and the sectional area of the in-plane conduit can be interpreted to be the entire length of the flow (from one manifold to the other). In such a manner, the connecting portion of the supply and discharge portion is smaller than that of the conduit (as the connecting portion cannot be larger than the supply or discharge

manifold and the conduit traverses the length of the cell from one manifold to the other) (as applied to claims 51 and 52) (fig. 5).

As to claim 56, Chizawa et al. teach of radiation fins [16] and cooling fans [17] which work in conjunction to cool the stack (col. 12, lines 56-60). Therefore some stagnating must occur in proximity to the fins, or else cooling would not occur (barring specification as to what specifically constitutes stagnating). Office personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Also, limitations appearing in the specification but not recited in the claim are not read into the claim. See *In re Zletz*, 893F.2d 319, 321-22,13 USPQ2d, 1320, 1322 (Fed. Cir. 1989). Furthermore, at the very least, the fans would be capable of being operated in such a manner, as the structure is the same as that claimed.

It has been held that the recitation of an element is "capable" of performing a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchinson,* 69 USPQ 138.

While intended use recitations and other types of functional language cannot be entirely disregarded. However, in apparatus, article, and composition claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference

as compared to the prior art. In re Casey, 370 F.2d 576, 152 USPQ 235 (CCPA 1967); In re Otto, 312 F.2d 937, 938, 136 USPQ 458, 459 (CCPA 1963).

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). See also MPEP § 2114.

The manner of operating the device does not differentiate an apparatus claim from the prior art. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

As to claim 62, as stated before, Chizawa et al. teach that both reactive gases (thus fuel) is supplied to their respective electrodes via separate lines, which causes reaction with the oxidant (col. 5, lines 5-10; col. 1, lines 47-52). The flowing of such a gas is indicative that it comes from some sort of a unit, and thus it is inherent that a fuel storage unit inherently exists. The basis for inherency is that if hydrogen is flowed to the fuel cell, it must come from some sort of storage unit or else it would not be able to be supplied. Please see the rejection of claim 44 for the Office's policy on inherency. Furthermore, at the very least, the line that delivers the fuel can be interpreted to be a storage unit, as it does store the fuel momentarily prior to deliver. Office personnel are to give claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir.

1997). Also, limitations appearing in the specification but not recited in the claim are not read into the claim. See *In re Zletz*, 893F.2d 319, 321-22,13 USPQ2d, 1320, 1322 (Fed. Cir. 1989). Lastly it is noted that this supplying happens while the fuel cell is being active with the reaction (taken to be when the power generation unit is being driven).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 46, 54, and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chizawa et al., as applied to claims 42, 43, 47, and 48, in view of US 6277508 (Reiser et al.).

As to claim 46, Chizawa et al. does not teach of having water suction means that suctions and removes water from the conduit.

However, Reiser et al. teach of a similar fuel cell system, wherein a hydrophilic separator plate is inserted in between the anode and cathode flow field (see fig. 1; col. 4, lines 54-60). The motivation for doing so would be direct water from the cathode flow field to the anode flow field, thus providing humidification to the anode flow field (col. 4, lines 61-64). This in turn would help manage the water content of the cathode flow field and would help prevent flooding (col. 4, lines 8-10). (Note the hydrophilic separator plate serves as suction means, as it sucks water from the cathode side, and thus the cathode conduit, and removes it to the anode side.) Therefore, it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to include a hydrophilic separator plate the cathode and anode flow field portions in order to help humidify the anode and in order to help properly manage water on the cathode side to prevent flooding.

As to claims 54 and 55, Chizawa et al. do not teach of a means for discharging water from an in-plane conduit (anode side) via pressure difference of the supply and discharge side (as required by claim 54), wherein the means opens a part of the

discharge passage to the atmosphere to create such a pressure difference (as required by claim 54).

Reiser et al. teach of a similar fuel cell wherein different water management systems are embodied. Reiser et al.'s embodies an external system (similar to that of Chizawa et al.'s) wherein the water from the cathode reactant exhaust is used to humidify the fuel reactant (col. 4, lines 8-18). However, Reiser et al. describe an the use of an internal water recovery system, wherein such a system is understood by one of ordinary skill in the art and that one or a combination of the different subsystems can be used (col. 4, lines 23-28). Specifically, Reiser et al. embody the use of a water management system that is internal (wherein a hydrophilic separator helps bring water from the cathode side to the anode side for proper humidification (col. 4, lines 54-64). Such a system has an anode recycling loop for better water management and an exhaust valve [67] which controls the ratio of what portion of the anode exhaust is recycled and what portion is exhausted from the system (thus to the atmosphere (as applied to claim 55)) (fig. 1; col. 5, lines 32-34 and 47-49). It is noted that the internal water management with an anode exhaust valve [67] is the means for discharging water from the system (as applied to claims 54), wherein it is inherent that such discharging is caused by a pressure differential within the supply and discharge passage of the anode side (as applied to claims 54-55). The basis for inherency is that the system, as described above, would not function if this were not the case (as the exhaust would not discharge from the exhaust valve if there was no force applied to the system (pressure differential between the supply and discharge passage) and would thus be stagnant).

Furthermore, it is noted that this is the same structure embodied Applicant (fig. 1; hydrogen purge valve [54]), and thus would work in the same manner. Please see the rejection of claim 44 for the Office's policy on inherency. It is noted that the exhausting of the used reactant from the hydrogen side would result in any excess water being discharged as well, as it is in the exhaust (as applied to claim 55). The motivation for using the internal system, as embodied by Reiser et al. (with the specified discharging means) is that the use of such a system would improve the water management of a fuel cell system. At the very least, one of ordinary skill in the art would have the substitution of internal water management system of Reiser et al. for the external system as embodied by Chizawa et al. obvious, as such a substitution would have yielded the predicable result of operating in the same manner (as a humidification/water management system). Raiser et al. specifically supports this view by teaching that known water management systems (including internal ones) are known in the art and be obvious to one of ordinary skill in the art to use any one or subcombination of such water management systems (col. 4, lines 23-28). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to use the internal system of Reiser et al. with the external system of Chizawa et al. in order to improve water management or to replace the external system of Chizawa et al. with that of Reiser et al., as such a substitution would yield the predictable result of having a working water management system that provides proper humidification.

12. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chizawa et al., as applied to claims 42, 43, 47, and 48, in view of US 2001/0019793 (Tsuyoshi).

Chizawa et al. does not teach that he connecting portion to the supply passage is smaller than the connecting portion to the discharge passage.

However, Tsuyoshi teaches a fuel cell with a collector plate (flow plate that allows for flow of reacting gases) (para 0007). Specifically, Tsuyoshi teaches that the supply hole (and thus the portion connecting to it) should be smaller than that of the discharge hole (and thus the connection portion to it) (para 0011). The fuel supply hole [71] is smaller than fuel discharge hole [72] (wherein although not particularly shown for the fuel, other flow connecting portions are shown are the same sizes as the hole that it corresponds to and would be expected to be the case for the fuel as well, as indicated by fig. 1) (fig. 1; para 0036). The motivation for doing so is that water content in the gas passages can be discharged efficiently (para 0057, lines 12-16). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to employ the use of larger discharge hole for fuel exhaust (and thus connection portion to such a passage) as taught by Tsuyoshi in order to provide better water discharging characteristics of the cell.

13. Claims 57-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chizawa et al., as applied to claims 42, 43, 47, and 48 in view of US 2002/0180448 (Imamura et al.) and US 2002/0168556 (Leboe et al.)

As to claim 57, it is noted that Chizawa et al. teach that the unreacted gas is controlled to a temperature lower than that of the reacted gas (col. 4, lines 17-18). Accordingly, there is inherently some sort of detecting means for temperature (environmental condition) in the reactant inlet and reactant outlet portion of the system.

The basis for inherency lies in the fact that inlet temperature cannot be controlled with respect to outlet temperature without being able to compare said temperatures. Accordingly, some sort of temperature detector inherently exists. Please see the rejection of claim 44 for the Office's policy on inherency. Furthermore, it is noted that Chizawa et al.'s invention is drawn toward heat exchange and water management (col. 4, lines 5-33).

However, Chizawa et al. does not specifically teach (a) environmental conditions being read by control means, wherein the control means controls gas flow means and (b) wherein control means controls cooling means.

With respect to (a), Imamura et al. teach of a similar fuel cell system, wherein water management is the focus (in order to keep the right amount of water in the system) (abs). Specifically, it teaches of having sensors, for example temperature sensors for detecting the temperature of the inlet of the air (oxidant), the temperature of the fuel cell, the outlet temperature of the air as well a humidity sensor in the air inlet, voltage and current sensors to determine the output of the fuel cell, as well as other sensors (not mentioned herein but seen in fig. 1) (para 0028; fig. 1). It is further noted that all of the sensors as well as the compressor [2] (which is linked to air distribution) are linked a controller (fig. 1; para 0029). Furthermore it is noted that the humidity in the air outlet is stream can be calculated via the controller (para 0063-0064). The motivation for employing the system of controls and sensors as taught by Imamura et al. to the system of Chizawa et al. is in order to accurately calculate the water content of the fuel cell in order that the water content can be adjusted properly (para 0006-0007;

claim 14; claim 12). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to employ the control system of Imamura et al to that of Chizawa et al. in order to impart a good control system to ensure an appropriate amount of water is available within the fuel cell for good operation.

With respect to (b), Leboe et al. provide the general teaching that heat transfer gas should be controlled to maintain the components [of a fuel cell] within preferred operating temperature ranges (para 0012). Accordingly, there is motivation to control the amount of cooling with respect to the temperature of the system components - to keep the system within preferred operating temperature ranges. Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to use a controller to control the cooling fan of Chizawa et al. in conjunction with the temperature of the fuel cell system in order to maintain good operational temperature of the system (as taught by Leboe et al.)

It is noted that the combination above has rendered obvious the use of humidity and temperature sensors, as read by a controller, wherein such a controller controls a cooling means as well as air flow. Accordingly, it is submitted that the combination is at the very least capable of functioning in the same manner, as it is structurally the same as the claimed invention. Please see the rejection to claim 56 for the Office's position on "capable of" as applied to apparatus claims.

As to claim 58, the combination of Chizawa et al., Imamura et al., and Leboe et al. render such a claim limitation obvious, since Imamura et al. teach of the temperature sensors and humidity sensor as seen in fig. 1.

As to claim 59, the combination of Chizawa et al., Imamura et al., and Leboe et al. render such a claim limitation obvious. As seen in fig. 1 of Imamura et al., there are temperature sensors (T) on the oxidant supply to the fuel cell (power generation unit), fuel cell, and oxidant exhaust. Furthermore, there is humidity sensor (H) on the oxidant supply line. Finally, it is noted that that Imamura et al. calculates the humidity in the outlet air (para 0063-0064). Accordingly, the combination is capable of detecting all of the aforementioned conditions of the fuel cell.

As to claim 60, the combination of Chizawa et al., Imamura et al., and Leboe et al. render such a claim limitation obvious. As set forth within the rejection to claim 57, the Imamura et al. renders obvious connecting the environmental condition sensors (temperature and humidity) as well as an air flow means (compressor [2]) to the controller (see fig. 1). Leboe et al. renders obvious connecting cooling means to a controller (see para 0012). Accordingly, the combination has all of the aforementioned connected to a controller (control substrate with a control circuit). Thus, the combination would at the very least be capable of operating in the claimed manner (controlling the driving of the gas flow means and cooling means based on the environmental condition), as it is structurally the same as the claimed invention. Please see the rejection to claim 56 for the Office's position on "capable of" as applied to apparatus claims.

As to claim 61, the combination of Chizawa et al., Imamura et al., and Leboe et al. render such a claim limitation obvious. As set forth in the rejection to claim 57, Leboe et al. renders obvious connecting cooling means to a controller (see para 0012). Imamura et al. renders obvious connecting the environmental condition sensors (temperature and humidity), voltage/amp sensors (to measure output of the fuel cell), as well as an air flow means (compressor [2]) to the controller (see fig. 1), wherein Imamura et al. specifically teaches of the capability of calculating the amount of water in the system (para 0007). Accordingly, the combination renders obvious the same structure as claimed by the instant application. Thus, the combination would at the very least be capable of operating in the claimed manner (controlling the gas flow means and cooling means according to the amount of water remaining in the power generation unit, which is calculated based on the environmental condition and the quantity of electric power generated by the power generation unit). Please see the rejection to claim 56 for the Office's position on "capable of" as applied to apparatus claims.

14. Claims 63 and 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chizawa et al., as applied to claim 42, in view of US 2002/0051898 (Moulthrop, Jr. et al.).

As to claim 63, Chizawa et al. do not teach having a pressure control means of the fuel supplied to the fuel cell (power generation unit).

However, Moulthrop, Jr. et al. teach of a fuel cell/electrolysis system, wherein the fuel cell operation version is similar to that of Chizawa et al. (proton using, see para 0003 of Moulthrop, Jr. et al.). It is specifically noted that Moulthrop, Jr. et al. teach of

including a pressure regulator [68], which is placed on the hydrogen feed to the fuel cell system (para 0046; fig. 2). The motivation for providing a pressure regulator on the hydrogen inlet stream, as taught by Moulthrop, Jr. et al. is so that the fuel is provided at optimal operating pressure during fuel cell operation (para 0046; fig. 2). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to include a pressure regulator on the hydrogen gas inlet in order to help keep the fuel cell system at its optimal operating pressure (and thus optimal conditions for optimal operation).

As to claim 81, Chizawa et al. teach of a general fuel cell system, which has a plurality of fuel cells [4] which react electrochemically to create power (power generation units) (col. 1, lines 30-43; fig. 1). It is stated that oxygen is fed to the system (and thus some conduit containing oxygen gas must exist) (col. 1, lines 48-51). It is specifically noted that Chizawa et al. embodies such a typical fuel cell with modifications, as there is a statement as to only differences to the general fuel cell of fig. 1 will be described in their embodiments (col. 2, lines 26-28). In one particular embodiment, cooling means, specifically radiation fins [16], for radiating heat to the outer atmosphere (heat radiation unit) is embodied (col. 5, lines 5-10; col. 12, lines 55-59; fig. 9). It is noted that the system has gas-feeding means (gas flow means) for the reactants (thus encompassing both oxidant and fuel), wherein the gas-feeding means feeds each reactant separately into the separator (col. 5, lines 5-10). Fig. 9 shows that there are cooling fans [17] (cooling means) to cool the radiation fins [16] (heat radiation unit). (It noted that the fans are necessarily driven independently from the gas flow means, as the reactants are

line to the fuel cells (as state within col. 5, lines 5-10), and fig. 9 shows that the fans are directed to the stack externally (via the arrows).)

Chizawa et al. does not particularly state that the fuel cell is used with an electronic apparatus.

However, Moulthrop, Jr. et al. show that the electricity (electric potential) generated during fuel cell operation is used to power an external load (electronic apparatus) (para 0005). Accordingly, the motivation for using the fuel cell system of Chizawa et al. in conjunction in a load would be use the electric potential created and not to waste it. Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to use the apparatus of Chizawa et al. in conjunction with a load in order to use the electricity generated and to not waste energy.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EUGENIA WANG whose telephone number is (571)272-4942. The examiner can normally be reached on 7 - 4:30 Mon. - Thurs., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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